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Citation for published version:

Iosad, P 2008, 'Initial consonant mutation and information flow in Mende', Paper presented at Old World Conference in Phonology 5, Toulouse, France, 17/01/08.

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

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Initial consonant mutation and information flow in Mende

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Old World Conference in Phonology 5
Université de Toulouse—Le Mirail
January 24, 2008

1 Purpose of the talk

This paper deals with the proper treatment of initial consonant mutation in Mende, a South-Western Mande language spoken mainly in Sierra Leone by around a million and a half people. The talk is structured as follows:

- I review the basic data pertaining to Mende consonant mutation and the approaches to it in the existing literature;
- I argue that the proper treatment of Mende mutation requires a different approach than that espoused by most of the theoretical literature. In particular, I show that the so-called “weak” grade must be taken as the elsewhere case rather than the “strong” one as generally assumed before;
- I show that the mutation cannot be derived by means of subsegmental prefixes and argue for a treatment in terms of allomorph selection driven by considerations of information flow;
- I adduce typological parallels from the unrelated languages Nivkh, Mundurukú, and Welsh.

2 Data

The consonant mutation system of Mende is simialar to that found in the other languages of the South-Western Mande group, in particular Loma, Loko and Bandi, and bears some resemblances to that of Kpelle (on the historical phonology of Mande, see Kastenholz, 1996; Vydrine, forthcoming). It is historically (and in some languages synchronically) related to the presence or absence of a velar nasal before the word.

The consonant inventory of Mende is presented in table 1 (Aginsky, 1935; Crosby, 1944; Innes, 1962; Tateishi, 1990; Kastenholz, 1996; Vydrine, forthcoming). Some dialects

Table 1: The consonant inventory of Mende

Manner	Labial	Coronal	Palatal	Dorsal	Labiovelar	Laryngeal
Unvoiced stop	p	t		k	kp	
Voiced stop	b	d	j	g	gb	
Prenasalized stop	mb	nd	nj	ŋg	(Ngb)	
Unvoiced spirant	f	s				
Voiced spirant	v					
Approximant	w	l	y			h
Nasal	m	n	ny	ŋ		

also possess implosives such as [ɓ]. The labial voiced fricative can be realized as either [v] or [β].

Mende consonant mutation (called “rules of contact” by Aginsky, 1935) is a two-term system with two “grades”, traditionally labeled “weak” and “strong”. The system is presented in table 2. The voiced stops, voiced fricative, approximants and nasals are all immutable.

Table 2: Mutation in Mende

Grade	Consonants									
Strong	p	t	k	kp	f	s	mb	nd	nj	ŋg
Weak	w, β	l	g, w	gb	v	j	b/ɓ	l	y	w, y

The following examples demonstrate the workings of the mutation:

- (1) *fà* ‘for (it)’ *gb’ε vā* ‘what for’
- (2) *pómā* ‘behind (it)’ *ndòpói wómā* ‘behind the child’
- (3) *ndòpói fēmbéngā* ‘the child swung (it)’
ndòpói mbòmèí vēmbéngā ‘the child swung the hammock’
- (4) *gbémíá ndòpó-ì kpàndì-á*
what child-DEF heat-PERF
‘What has the child heated?’
- (5) *ngúlé-í mìa ndòpó-ì kpàndì-á*
oil-DEF FOC child-DEF heat-PERF
‘The child has heated *the oil*’
- (6) *ndòpó-ì ngúlé-í gbàndì-á*
child-DEF oil-DEF heat-PERF
‘The child has heated the oil’

2.1 Contexts

The following contexts have been isolated for mutation in Mende.

NB! In all the discussed accounts “mutated” means “in the weak grade”

The initial mutated consonant is shown in bold. The initial consonant mutates in the following contexts:

1. In a transitive verb preceded by an object: *ì nyá wókɔ̀ɛ̀lɔ̀* ‘he imitated me’;
2. In a head noun preceded by a dependent noun: *ndòpói b̀òwɛ̀í* ‘the child’s knife’ (*mb̀òwɛ̀í* ‘the knife’)
3. In a postposition preceded by a dependent noun: *nd̀ɛ̀nd̀ɛ̀í bù* ‘in the shade’ (*mb̀ù* ‘under’);
4. In adjectives following a noun: *ngílà j̀ɛ̀mbɛ̀í ná* ‘that big dog’ (*s̀ɛ̀mbɛ̀* ‘big’);
5. In some intransitive verbs: *mú v̀ɛ̀mbɛ̀ílɔ̀ ngúlíí hɔ̀* ‘we swung on a tree’ (*f̀ɛ̀mbɛ̀í* ‘the swing’);
6. In the second part of N–N compounds: *f̀ɛ̀f̀ɛ̀ l̀ɛ̀nd̀ɛ̀í* ‘sailboat’ (*nd̀ɛ̀nd̀ɛ̀í* ‘boat’)

Mutation “fails to apply” when an object of a transitive verb or a postposition is zero, in transitive verbs after extracted objects (examples 4, 5) and in intransitive verbs in certain constructions, e. g. *tí k̀àkpángà ngì má* ‘the surrounded him’.

3 Previous approaches

The prevailing approach to Mende mutation in the generative framework (Rice and Cowper, 1984; Conteh et al., 1985; Lieber, 1983; Seidl, 2001; Tokizaki, 2005) has been to link it to very general conditions on the syntactic or prosodic structure of clauses.

3.1 The syntactic account

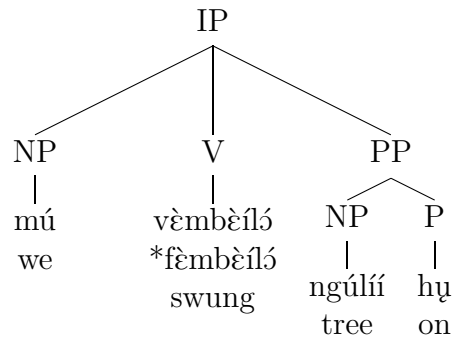
Thus, Rice and Cowper (1984, 311) state:

If a lexical item of a major category c-commands and is immediately to the right of any phonological material then the initial consonant of that item mutates.

By “mutates” Rice and Cowper (1984) mean “exhibits the weak grade”, since the strong grade has been considered the “basic” one since Aginsky (1935); Manessy (1964).

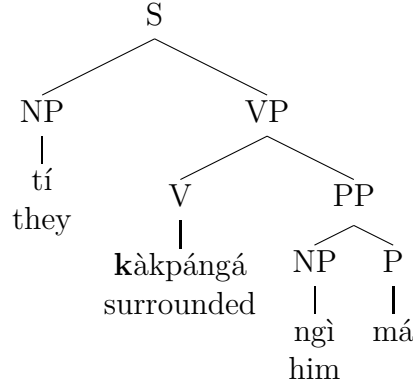
Thus, their approach predicts the differences between (7), where the verb is mutated, and (8), where there is no mutation. According to them, since the verb in (7) is not embedded inside a VP, it is able to c-command the preceding subject, whereas in (8) it form a separate constituent with the PP and thus is too deeply nested to interact with any material to its left

(7)



‘We swung on the tree’

(8)



‘They surrounded him’

Cowper and Rice (1987) present the same idea in terms of prosodic phonology: let every left boundary of a branching maximal projection be a prosodic phrase boundary. Then mutation applies only inside phonological phrases.

Tateishi (1990) points out the empirical problems with this approach. First, it does not predict mutation of intransitive verbs with no rightward branches, as in *wá!* ‘come!’ (cf. the related noun *pá* ‘coming’), and consistent mutation of inalienably possessed nouns (such as body parts and kinship terms). The account also predicts objects of prepositions to be mutated, but this is not true (*à ndúwá* ‘with fear’, but cf. mutated *ngì lúwà hìndèí* ‘his cowardice’). Also, adverbs, even though they are usually postverbal and VP-internal, do not undergo mutation.

3.2 The prosodic account

A similar idea was recently explored by Tokizaki (2005) in Minimalist terms. He argues that prosodic boundaries are built by an algorithm that puts a boundary wherever the boundary of a syntactic constituent is encountered, with later erasure of a certain amount of boundaries (two for Mende). Thus, for Tokizaki the contrast between (7) and (8) is captured in the following way:

- (9) $IP_{[NP[mú] \ V[vèmbèíló] \ PP_{[N[ngúlíí] \ P[hụ]]}]}$
 // mú // vèmbèíló /// ngúlíí // hụ ///
 mú vèmbèíló / ngúlíí hụ /

- (10) $IP_{[NP[tí] \ VP_{[V[kàkpángà] \ PP_{[N[ngì] \ P[má]]}]}]}$
 // tí /// kàkpángà /// ngì // má ////
 tí / kàkpángà / ngì má //

This account makes an important prediction which turns out to be wrong. Wherever a potentially mutable lexical item is preceded by a Merged constituent, it will have at least three boundaries before it: its own left boundary, the right boundary of the Merged item and the right boundary of the rightmost item Merged into the former. With deletion of two boundaries mutation is never predicted to apply after Merged constituents, but this is not the case, cf. (11), from (Innes, 1962, 102).

- (11) *mahε-i nyahε-i-sia va*
 chief wife-DEF-PL for
 ‘for the chief’s wives’

$$\text{NP} [\text{NP} [\text{N} [\text{mah}\epsilon\text{i}] \text{N} [\text{nyah}\epsilon\text{isia}]] \text{P} [\text{fa}]]$$

 /// mahεi // nyahε-isia /// fa //
 */ mahεi nyahεisia / fa /

Note that this example abstracts away from the syntactic complications of building a complex word-form such as *nyahεisia*: it is apparently a DP with the definite suffix *-i-*, which is a phrasal-level suffix as demonstrated by the fact that it attaches to the rightmost word in a NP (Aginsky, 1935, 25).

3.3 The morphological account

Tateishi (1990, 101) proposes the following solution:

[Mutation is] the marker of agreement with a nominal element prefixed to the head whose maximal projection contains a nominal element.

For Tateishi (1990), this “nominal element” is frequently null. Here is how he deals with the different mutation cases:

1. Transitive verbs and postpositions with overt objects mutate because of the presence of this object inside VP resp. PP;
2. Compounds mutate because they are heads, thus the preceding noun is contained within their maximal projection;
3. The mutating intransitive verbs are mostly motion and experiencer verbs, which Tateishi (1990) takes to be unaccusative (though he acknowledges the presence of mutated unergative verbs such as ‘fight’ and ‘work’). The structure then involves a trace of a subject moved out of the VP;
4. Inalienably possessed nouns (always mutated) are claimed to be marked with a zero possessive marker at all times;
5. Adjectives, according to Tateishi (1990, 107), are not very different from verbs, and thus also undergo movement of a subject out of a VP. Strangely, Tateishi (1990) only considers the cases of branching APs, even though single adjectives are also mutated;
6. Non-mutation of objects of prepositions follows straightforwardly, since the preposition is outside of the noun’s maximal projection;

7. Non-mutation of transitive verbs and postpositions follows straightforwardly;
8. Non-mutation of verbs after extracted objects follows from an additional assumption (Tateishi, 1990, 108): “An empty category in a Case-marked position under lexical government is incorporated into a lexical item that governs it”. The examples in (4,5) are derived via this incorporation, which makes the trace ineligible as a trigger.
9. Non-mutation of adverbs follows straightforwardly

3.4 Finally... the phonology

One common feature of all these accounts is that they do not pay attention to how the mutation works in the phonology. A explicit autosegmental account is to be found in (Lieber, 1987). For Lieber, the mutation involves a mutation trigger [+voice +continuant] which docks to the initial consonant and produces the relevant changes, with a few readjustment rules.

There are several problems with her account.

- The interpretation is that of Rice and Cowper (1984);
- She introduces the autosegment via a “clitic” which is inserted at the left edge of any branching maximal projection. The status of this clitic is unclear: it is obviously not a meaningful morpheme (a point made by Rice and Cowper, 1984);
- Lieber must account for non-mutating items, that is, words which resist mutation even in mutation contexts. In (Lieber, 1987) she does a similar thing for another language, Fula, via prespecification: once segments are prespecified for a feature lexically, the mutation autosegment cannot change that specification. However, some words always appear in the strong grade (*pawa* ‘payment’, *pani* ‘pan’, *kenya* ‘uncle’), others always take the weak grade (*lamboi* ‘lamp’, *bulu* ‘trumpet’, *dɔwu* ‘duck’).
- This means that the only available scenario for Lieber is to represent the mutating words as underspecified for the relevant feature. The reasoning runs thus: “dock the mutation features if available (deriving the weak grade), else apply redundancy rules (deriving the strong grade)”. The consequence of this approach is the introduction of some highly counterintuitive redundancy rules: if the strong grade is the default, the unmarked voiced stop in Mende is prenasalized, for example;
- There are problems with the features Lieber uses: they do not derive the implosive [ɓ] and do not directly derive the *w~y* variation in the “velar” weak grade.

4 Rest of the talk

- I argue for a reconsideration of the pattern of Mende mutation, according to which the weak grade is default;
- I show that a phonological treatment is undesirable, even if possible;
- I argue for a lexical insertion account;
- I adduce typological parallels.

5 The proposal

In this talk I show that the proper treatment of Mende consonant mutation requires a change of the basic assumption. My revision is as follows:

The elsewhere case in Mende involves the weak rather than the strong grade. All cases which have hitherto been described as “mutated” are in fact the unmarked ones, whereas the “unmutated” ones are derived.

The presence of the strong grade can be connected with a provisional “prefix” which functions as a third person singular marker and as a noun marker (probably originally deriving via a referentiality marker). The existence of such prefixes in some other Mande languages is well-established since at least Hyman (1973); on the history of these markers, see Dwyer (1986).

Ways in which this makes sense:

- **Historically:** in fact, such a reanalysis has been proposed (but not pursued) by Vydrine (forthcoming). As in most other South-Western Mande languages, the weak grade in Mende comes about from a sweeping context-free lenition of initial stops. Only postnasal stops were shielded from this process, and this means that in initial position the only stops to not have been lenited are those which were preceded by a nasal prefix (Vydrine’s *ɲ̃). This nasal prefix was a meaningful morpheme in Pre-Mende. This means that the environment for the weak grade from a historical point of view is best described as “everywhere except where preceded by the nasal prefix”. Cf. the following quotation from Kastenholtz (1996, 102):

First, in Proto-Mende-Looma there developed a general syntagm-initial noun marker, possibly from the 3sg personal pronoun... so the initial consonant of nouns (as well as transitive verbs in citation form and all nominalized verbs) appeared in the context of a nasal considerably more often than before. Second, *all other contexts* were interpreted as *intervocalic*, so that the gradation of the light series in these languages is to be seen as a change of the relevant consonants under the influence of the intervocalic position.

(my translation, author’s emphasis)

- **Syntactically:** This decision allows us to describe all the data adequately:
 - The mutation pattern of transitive verbs and postpositions comes for free: without an overt object they are interpreted as having a 3sg object. The obligatory object marking is not unknown in other Mande languages, e. g. Beng (Paperno, 2006);
 - The “mutation” of unaccusative verbs requires no traces: if the weak grade is the default one, “nothing happens”. The appearance of the strong grade in all nominalizations is handled straightaway;
 - The “mutation” of adjectives comes for free: if the noun marker is actually an NP marker (cf. Kastenholtz’s “syntagm-initial”), adjectives are not expected to mutate. The same reasoning applies to second elements of compounds;

- The non-mutation pattern of adverbs is explained straightaway: since no marker is expected to precede them they just show their lexical form, which can be either “weak” or “strong”, cf. *vuli* ‘very’ (weak), *fo* ‘completely, all’ (strong);
- The mutation pattern of preposition objects comes for free: since a noun after a preposition starts its own NP, it is expected to have strong grade;
- There is no need to stipulate Tateishi’s empty category incorporation. Consider again the examples (4) and (6)

(4) *gbémíá_i ndòpó-ì t_i kpàndì-á*
 what child-DEF heat-PERF
 ‘What has the child heated?’

(6) *ndòpó-ì ngúk-í gbàndì-á*
 child-DEF oil-DEF heat-PERF
 ‘The child has heated the oil’

Tateishi (1990) has to stipulate that the trace in (4) “does not count” as a “mutation trigger”. Under the proposed approach, this behaviour follows straightforwardly if the trace is an actual resumptive pronoun.

- The contrast between mutating and non-mutating intransitive verbs is argued by Conteh et al. (1985) to be that between intransitive verbs which strictly subcategorize for a following phrase (and take the strong grade) and those where the postverbal phrase is optional (these take the weak grade). My approach predicts that the subcategorizing class requires an object; this needs to be tested;
- Inalienably possessed nouns thus appear to have no explicit possessor. This is maybe connected to the tendency of alienable possession to be more saliently marked.

- **Phonologically:** how does the phonology work?

5.1 The phonological workings

Table 3: Mutation in Mende

Grade	Consonants									
Strong	p	t	k	kp	f	s	mb	nd	nj	ŋg
Weak	w, β	l	g, w	gb	v	j	b/6	l	y	w, y

If the weak grade is the elsewhere case, we are faced with a phonological problem: thus, weak grade [l] can correspond strong grade [l] and [nd], similarly for [b] ([mb] or [b]), [w] ([p], [w], [g], [k]), [y] ([y], [g], [nj]). One possible solution is the proliferation of abstract segments à la (Anderson, 1976): [l]₁ alternates with [nd] and [l]₂ does not alternate. The advantages of this system are not obvious.

There is also no feature bundle which produces all the necessary changes in one fell swoop: this hypothetical bundle derives prenasalized stops from voiced stops and unvoiced fricatives from voiced ones. Besides, there exist both alternating and non-alternating weak grade segments. Underspecification can technically capture the distinction, but some of

Table 4: Mutation in Mende revised

Grade	Consonants							
Weak	w	l	g	gb	v	y	b	j
Strong	p, k, ŋg	t, nd	k	kp	f	nj, ŋg	mb	s

the redundancy rules are still strange (e. g. if the weak grade is default, the unmarked fricative is voiced).

I propose that Mende consonant mutation is not “phonology” but lexical insertion.

Stipulation (full specification) is needed in any framework to account for the non-mutating lexical items. I submit that the mutating items are those which are lexically specified as having two forms. The phonological interrelation of the two forms need not be derivable by any single rule (since they are lexically specified anyway).

5.2 Mutation and information flow

The weak grade is derived (historically) by a process which can be described as lenition. Harris and Urua (2001) construe lenition as loss of information (they formalize it as loss of salient cues). Indeed it can be argued that the cues for the prenasalized stops are more salient than just for voiced stops and those for stops in prevocalic position are more salient than those for glides.

I propose that the choice of allomorphs is driven by considerations of information flow. The presence of a marker, which under this approach does not necessarily have to bear any phonological features, means more information; more information is signalled by the more salient strong grade (where available).

The important implication of this hypothesis is even though the pattern seems phonologically coherent, autosegmental approaches based on traditional feature systems fail to derive it in a unified way. If the burden of explanation is not on the phonological grammar, no wrong predictions are made.

6 Typological parallels

The idea that mutation marks important junctures has solid typological parallels:

- Nivkh is analyzed by Shiraishi (2006) as marking salient boundaries (left edges of IP and NP) by lack of an initial mutation which degrades the amount of information. Thus, the salient boundaries are consistently marked by information-bearing segments;
- In Mundurukú (Picanço, 2005), the only possible mutation site is that between an argument and immediately following head;
- In several other Jê languages various phonological changes such as syncope and truncation happen to heads without an immediately preceding dependent; the boundary between a dependent and a head blocks mutation. Interestingly, Salanova (2004) explains truncation in Mëbengokre as involving a 3sg prefix;

- In Welsh, the boundary between a lexical XP and a following YP if XP c-commands YP is signalled by soft mutation (Borsley and Tallerman, 1996)

7 Summary

- I have shown that Mende consonant mutation must be reanalyzed in terms of the weak grade being the elsewhere case;
- I have argued that autosegmental prefixation cannot account for the needed phonological changes and that these changes are outside of the purview of phonology;
- I have proposed that Mende consonant mutation must be viewed as lexical insertion driven by information flow considerations;
- The take-home message is that not everything which looks like phonology must be accepted as part of the phonological computation.

8 Desiderata

- Iron out the syntactic account, in particular with reference to the intransitive verbs;
- Develop an account of Mende phonology which makes the pattern of mutation more coherent. Maybe the changes can be formalized in terms of phonological complexity (e. g. number of unary features) rather than acoustic cues as in (Harris and Urua, 2001).

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